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Date: January 14, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

In re application of)	
)	
JOHN ROBERT LOCKEMEYER)	
)	
Serial No. 09/992,784)	Group Art Unit: 1725
)	
Filed November 6, 2001)	Examiner: C. A. Johnson
)	
CATALYST COMPOSITION)	January 14, 2005
)	

COMMISSIONER FOR PATENTS
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF

The above Applicant hereby files this brief on appeal containing his arguments as to why the final rejection of claims 1-49, by Office Action of July 7, 2004 (hereinafter "Office Action"), should be overturned by the Board. Please charge the fee of \$500.00 for this brief to Shell Oil Company, Deposit Account No. 19-1800.

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Real Party of Interest

The real party of interest is the assignee, Shell Oil Company.

Related Appeals and Interferences

There are no known related appeals or interferences.

Status of the Claims

Claims 1-53 were presented for examination. Claims 50-53 were cancelled. Applicant reserves the right to file and prosecute a divisional application related to the subject matter of these claims 50-53. Claims 1-49 are the subject of the present Appeal and stand rejected by the Examiner.

Status of Amendments

All amendments were entered prior to the final rejection. No amendments were proposed after the final rejection.

Summary of Claimed Subject Matter

The present invention provides a solution to the problem of improving the catalytic properties of certain supported catalysts, in particular silver-containing catalysts with specific promoters (phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, and rare earth metals, as defined in claim 1). An improved catalyst performance (activity and/or selectivity) was found by selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes, and depositing the specific promoters (also referred to as catalytically active components) onto the carrier (cf. U.S. Patent Application Serial No. 09/992,784 (hereinafter "Application"), page 2, line 29 – page 3, line 2). The sodium solubilization rate of a carrier is a property which is distinct from bulk properties of the carrier material, such as for example the content of impurities (sodium) in the bulk carrier material (cf. Application, page 2, lines 34-36). Evidence for the improvements can be found in the working examples of the Application (cf. page 10, line 18 – page 20, line 22). The working examples demonstrate the selection of carriers according to their sodium solubilization rate, the preparation of the catalysts, and their testing in the vapor phase epoxidation of olefins, in particular ethylene, cf. in particular Table II on page 19 and the explanation provided at page 20.

The invention as claimed provides processes for preparing the catalysts and it provides the catalysts per se.

In independent claim 1, a process is claimed for preparing the catalysts.

In independent claim 13, a process is claimed for preparing the catalysts, which catalysts are suitable for the vapor phase production of epoxides.

In independent claim 28, the catalyst per se is claimed.

In independent claim 37, the catalyst per se is claimed, which catalyst is suitable for use in the vapor phase production of epoxides.

In the claims, the term "promoter" refers to a component which works effectively to provide an improvement in one or more of the catalytic properties of the catalyst when compared to a catalyst not containing such component (cf. Application, page 5, lines 4-10).

In the claims, the term "sodium solubilization rate" refers to the rate of solubilization of the sodium in a solution after the carrier is placed in the solution under specified conditions (cf. Application, page 3, lines 3-13; page 13, lines 2-14).

In the claims, the term "suitable for the vapor phase production of epoxides" refers to the suitability of the catalysts for use in that production process, for example in that the catalyst is capable of being loaded into an epoxidation reactor and can withstand the reaction conditions typically applied in such production process. One skilled in the art is aware of such reactors and reaction conditions, and additional teaching has been provided in the Application (cf. page 10, lines 4-13; the examples, referred to hereinbefore).

Grounds of Rejection to be Reviewed on Appeal

Claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,187,140 (hereinafter "Thorsteinson").

Claims 6-7, 19-20, 34-35, and 43-44 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,187,140, as applied to claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 above, and further in view of U.S. Patent No. 5,739,075 (hereinafter "Matusz").

Claims 1-6, 9-19, 22-34, 37-43, and 46-49 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 2,424,083 (hereinafter "Finch") in view of U.S. Patent No. 4,994,587 (hereinafter "Notermann").

Claims 7-8, 20-21, 35-36, and 44-45 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 2,424,083 in view of U.S. Patent No. 4,994,587 as applied to claims 1-6, 9-19, 22-34, 37-43, and 46-49, and in further view of U.S. Patent No. 5,739,075. In raising the fourth rejection, the Examiner relied upon the modified disclosure of Finch as applied to claims 1-6, 9-19, 22-34, 37-43, and 46-49.

Argument

1. Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 5,187,140

1.1 Claims 1-5, 8-10

In view of claims 1-5 and 8-10, the following arguments are presented.

The Examiner stated on page 4 of the Office Action:

[T]he [Thorsteinson] reference discloses that cesium sulfate exemplified in combination with carrier AJ to be functionally equivalent to the promoters and combinations required by the instant claims. It would be obvious to one having ordinary skill in the art at the time the invention was made to have substituted the ce[s]ium sulfate supported on carrier AJ with any other, functionally equivalent promoters taught by the reference, with a reasonable expectation of success.

According to *Graham v. John Deere Company*, the factual inquiries for determining obviousness include: (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the pertinent art; and (4) considering secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). According to the Manual of Patent Examining Procedure, 8th Edition, Incorporating Revision No. 2 (hereinafter "MPEP"), section 2141.02, "[a]scertaining the differences between the prior art and the claims at issue requires . . . considering both the invention and the prior art references as a whole." Also, "[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a certain feature is later established. (cf. MPEP § 2141.02 (citing *In re Rijckaert*, 9 F.3d 1531, 28 U.S.P.Q.2d 1955 (Fed. Cir. 1993))).

It is respectfully submitted that, on the one hand, the Examiners' statement is not based on a consideration of both the invention and the reference as a whole, and, on the other hand, it is based on what is not known at the time the invention was made. These submissions will be clarified in the following paragraphs.

As regards giving consideration to both the invention and the reference as a whole, the following is observed.

As set out hereinbefore, the invention as claimed is based -as a whole- on the finding that an improved catalyst performance can be achieved by selecting a carrier which has a sodium solubilization rate of no greater than 5 ppmw/5 minutes and depositing the specific promoters onto the carrier as specified in the claims. The

Examiner has not considered the invention as a whole, in that he did not consider the feature of selecting a carrier which has a sodium solubilization rate of no greater than 5 ppmw/5 minutes. The Examiner did also not consider the technical effects (advantages) of selecting such a carrier vis-à-vis selecting a carrier which does not meet the required sodium solubilization rate.

When considering Thorsteinson, the Examiner focused on washed carrier AJ on the presumption that, as an inherent property, carrier AJ has a sodium solubilization rate of no greater than 5 ppmw/5 minutes. The Examiner acknowledged that Thorsteinson does not specifically disclose that the carrier AJ has a sodium solubilization rate of no greater than 5 ppmw/5 minutes (cf. Office Action, paragraph bridging pages 2 and 3; page 9, first full paragraph).

When considering Thorsteinson, i.e. the reference, as a whole, it becomes apparent that Thorsteinson does not give the skilled person any motivation to select any particular carrier, for example the washed carrier AJ, from the large number of carriers which have been disclosed by Thorsteinson. Namely, if the impregnation solution is used and reused there is a choice of either removing such ions, or taking them into account during the catalyst preparation (cf. Thorsteinson, column 15, lines 20-30). Removing the ions would point to the use of washed carrier; taking them into account during the catalyst preparation would point to the use of unwashed carrier. If the impregnation solution is not reused, there is no apparent motivation to select a washed carrier. Also, there is no motivation to use the washed carrier AJ because its preparation requires elaborate washing and drying, as disclosed in column 46, lines 7-11, which other carriers do not require. Further, nowhere in Thorsteinson there is a statement suggesting that selecting the washed carrier AJ from the large number of carriers disclosed would lead to an improved catalyst performance.

Thorsteinson -as a whole- also teaches silver epoxidation catalysts having an enhanced activity and/or stability. There are provided silver epoxidation catalysts in which advantages of high silver content can be realized by combining a high silver content with a high surface area, high porosity carrier (column 6, lines 24-33). Thorsteinson is completely silent on the sodium solubilization rate of the carriers disclosed. Thorsteinson does not suggest or teach that an improved catalyst performance can be achieved by selecting a carrier which has a sodium solubilization rate of no greater than 5 ppmw/5 minutes and depositing the specific promoters onto

the carrier. Indeed, there is no statement in Thorsteinson suggesting that an improved catalyst performance can be achieved by selecting carrier AJ (which the Examiner presupposed to meet the sodium solubilization rate requirement) and depositing the specific promoters onto carrier AJ.

The Examiners' rejection is also based on what is not known at the time the invention was made. As mentioned hereinbefore, the Examiner considered that the property relied upon by applicant (i.e. a sodium solubilization rate of no greater than 5 ppmw/5 minutes) is in fact an inherent characteristic of carrier AJ. The Office Action at page 9 states:

The reference details a specific washing sequence that lowers the amount of leachable sodium in carrier AJ. The examiner notes that sodium is removed by a similar washing procedure in the instant specification. Therefore, the examiner would submit that there is a reasonable basis for the assertion that the claimed property would in fact be inherent. The burden shifts to applicant to establish that this characteristic would not be inherent.

It is respectfully observed that the instant specification was not known subject matter at the time the invention was made, and that therefore the instant specification can not be used as a basis for the Examiner's assertion that the claimed property would in fact be inherent in Thorsteinson's carrier AJ. As stated in MPEP, section 2141.02, "[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established." Moreover, the source of carrier AA, from which carrier AJ was prepared, is not specified (cf. Thorsteinson, column 42, lines 31-65) so that Applicant is able to repeat Thorsteinson's washing of carrier AA.

The Examiner's further statement that "[t]he burden shifts to applicant to establish that this characteristic would not be inherent", is not well based, for two reasons. The first reason is that the Examiner's submission of an inherent disclosure is not well based (cf. previous paragraph). The second reason is that the matter at issue relates to inherency which is a form of novelty and is unrelated to nonobviousness (cf. MPEP § 2141.02, cf. also *In re Fitzgerald*, 619 F.2d 67, 205 U.S.P.Q. 594 (CCPA 1980), cited by the Examiner, Office Action, page 3, first paragraph). Specifically, while citing to *In re Fitzgerald et al.* 205 USPQ 594, the Examiner stated: "the functional language asserted to be critical for establishing novelty in claimed subject matter may in fact be an inherent characteristic of the prior art" (emphasis added).

Thus, the Examiners' rejection on the basis of obviousness is, on the one hand, not based on a consideration of both the invention and the reference as a whole, and, on the other hand, it is based on what is not known at the time the invention was made. Further, it not only appears that the Examiner's rejections of the claims on the basis of obviousness over Thorsteinson are not well based, there are clear indications that the claims are unobvious and patentable over Thorsteinson.

1.2 Claims 13-18, 21-27

In view of claims 13-18 and 21-27, Applicant relies on the arguments presented above, in Section 1.1, in view of claims 1-5 and 8-10. These arguments apply analogously in support of nonobviousness of claims 13-18 and 21-27. The arguments presented in Section 1.1 are incorporated by reference in this Section 1.2.

1.3 Claims 28-33, 36

In view of claims 28-33 and 36, Applicant relies on the arguments presented above, in Section 1.1, in view of claims 1-5 and 8-10. These arguments apply analogously in support of nonobviousness of claims 28-33 and 36. The arguments presented in Section 1.1 are incorporated by reference in this Section 1.3.

1.4 Claims 37-42, 45-49

In view of claims 37-42 and 45-49, Applicant relies on the arguments presented above, in Section 1.1, in view of claims 1-5 and 8-10. These arguments apply analogously in support of nonobviousness of claims 37-42 and 45-49. The arguments presented in Section 1.1 are incorporated by reference in this Section 1.4.

2. Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 5,187,140 in view of U.S. Patent No. 5,739,075

2.1 Claims 6-7

In view of claims 6 and 7, the following is arguments are presented.

Applicant's considerations relating to Thorsteinson, as presented above, are also relied upon in traversing the present rejections.

Matusz teaches the preparation of improved supported silver catalysts for the epoxidation of olefins, by pre-doping, pre-treating or pre-impregnating the carrier with a salt of a rare earth metal and a salt of an alkaline earth metal and/or a Group VIII transition metal. Any of a large number of carriers or support materials may be used, for example alpha-alumina (cf. Matusz, col. 2, lines 12-36; col. 4, lines 10-32; col. 15, lines 42-45).

Each of the presently rejected claims involves "sodium solubilization rates." Matusz, like Thorsteinson (as discussed above), is silent with respect to sodium solubilization rates and any effect which they have on the performance of a catalyst in an epoxidation process. It follows that any combination of Thorsteinson and Matusz could not teach or suggest the sodium solubilization rates involved in the claims at issue. Modifying the invention of Thorsteinson by including additional promoters taught by Matusz does not provide the invention as presently claimed. Therefore, the claims are unobvious and patentable over Thorsteinson in further view of Matusz.

2.2 Claims 19-20

In view of claims 19 and 20, Applicant relies on the arguments presented above, in Section 2.1, in view of claims 6 and 7. These arguments apply analogously in support of nonobviousness of claims 19 and 20. The arguments presented in Section 2.1 are incorporated by reference in this Section 2.2.

2.3 Claims 34-35

In view of claims 34 and 35, Applicant relies on the arguments presented above, in Section 2.1, in view of claims 6 and 7. These arguments apply analogously in support of nonobviousness of claims 34 and 35. The arguments presented in Section 2.1 are incorporated by reference in this Section 2.3.

2.4 Claims 43-44

In view of claims 43 and 44, Applicant relies on the arguments presented above, in Section 2.1, in view of claims 6 and 7. These arguments apply analogously in support of nonobviousness of claims 43 and 44. The arguments presented in Section 2.1 are incorporated by reference in this Section 2.4.

3. Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 2,424,083 in

view of U.S. Patent No. 4,994,587

3.1 Claims 1-6, 9-12

In view of claims 1-6 and 9-12, the following arguments are presented.

Each of these claims involves "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes." In rejecting these claims, the Examiner asserted in the Office Action (cf. pages 6-7) that:

Finch et al. does not disclose that the support is treated such that the sodium solubilization rate is no greater than 5 ppmw per 5 minutes.

Notermann et al. (US 4,994,587) discloses a catalytic system for epoxidation of alkenes. The catalyst comprises silver on a solid support (column 11, lines 55-60).

The support has less than about 50 and most frequently less than about 20 ppm of

leachable sodium (column 11, lines 60-63). A preferred support material is alpha alumina (column 13, lines 1-2).

Notermann et al. teaches that improved results are obtained by using a support wherein the support contains low levels of leachable sodium (column 13, lines 28-35). Notermann et al. teaches that the presence of leachable sodium exhibits deactivating and effective life-shortening effects on the catalytic system (column 11, lines 18-25). The low sodium support can be prepared by any methods suitable for removing sodium from a solid (column 13, lines 40-45). Typically the techniques involve extraction and/or volatilization of the sodium present (column 13, lines 50-68). Prepared supports have BET surface areas of 1.56 m²/g (column 23, Example 1).

Notermann et al. does not specifically disclose that the sodium solubilization rate of the carrier is no greater than 5 ppmw/5 minutes. However, it is considered that because Notermann et al. teaches removing leachable sodium from the carrier material, the resulting material will have the solubilization rate instantly claimed.

The Examiner's rejection is based upon an assertion by the Examiner that Notermann inherently discloses "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes." However, to satisfy the Examiner's burden of proof, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990); see also *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999). Further, as discussed hereinbefore, it follows from the MPEP that "[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established."

The Examiner's reasoning, quoted above in the block quote, does not reasonably support a determination that "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes" necessarily flows from the teachings of Notermann. Without more, a teaching of sodium removal and levels of leachable sodium, which the Examiner asserts are present in Notermann, provide insufficient basis for any determinations or estimations concerning whether a sodium solubilization rate is no greater than 5 ppmw/5 minutes. At best, the Examiner has proposed a mere possibility. For example, while the carrier as treated in Example 1 of Notermann by heating with NH₄F may have a relatively low sodium content, the carrier could possibly still have a relatively high sodium solubilization rate when contacted with water. Thus, the Examiner has not satisfied the burden of proof required to maintain this rejection based on a theory of inherent disclosure, in particular, that the inherency was established before the invention was made. In addition, nowhere does Notermann

teach or suggest selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes and subsequently using the carrier for making a catalyst comprising silver and promoters selected from phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.

As acknowledged by the Examiner, "Finch et al. does not disclose that the support is treated such that the sodium solubilization rate is no greater than 5 ppmw per minutes" and "Notermann et al. does not specifically disclose that the sodium solubilization rate of the carrier is no greater than 5 ppmw/5 minutes." Because each of the presently rejected claims involves "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes," any combination of Finch with Notermann could not teach or suggest the claimed subject matter. As indicated hereinbefore, "[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established."

In the Office action at page 7, the Examiner submitted:

It would have been obvious . . . to substitute the carrier taught by Finch . . . with the carrier taught by Notermann . . . in light of the suggestion of Notermann . . . that the use [of] the low sodium alumina carrier will obtain a catalyst with improved properties and avoid deleterious effect of leachable sodium. Since both catalysts can be used to convert ethylene to ethylene oxide, one would have reasonable expectation of success from the combination.

However, it is respectfully submitted that the Examiner has based the rejections on a selective consideration of only portions of Notermann. According to the MPEP, section 2141.03, "[a] prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention" (emphasis added) (citing *W.L. Gore & Associates, Inc., v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), *cert denied*, 469 U.S. 851 (1984)).

Applicant respectfully submits that the Examiner's citation of Notermann at column 13, lines 28-35 has to be read in conjunction with Notermann's passages in column 11, lines 19-47 and column 12, lines 8-10, which teach that different instances lead to different effects of leachable sodium, namely:

The presence of leachable sodium . . . tends, in some instances, to improve the efficiency of the system under epoxidation conditions generally used. In the presence of CO₂ and certain efficiency enhancing compounds, however, sodium exhibits deactivating and effective life-

shortening effects on epoxidation catalysts and systems. . . . The catalyst and process of . . . [Notermann's] invention diminish the deactivating and life-shortening effects of CO₂”

. . . .
[Notermann's] . . . invention provides a catalytic system which includes a stable catalyst even . . . with recycled effluent streams containing carbon dioxide. (emphasis added)

Thus, on the one hand, Notermann contains the general teaching that the presence of leachable sodium improves the efficiency under epoxidation conditions generally used, and, on the other hand, Notermann contains the specific teaching only applicable to cases of deactivating and life-shortening effects of having the combination sodium in the catalyst and carbon dioxide in the feedstream, in which it is advantageous to use Notermann's invention, i.e. to use a carrier with a low content of leachable sodium.

Finch teaches “catalyst compositions having a high initial activity in a wide variety of chemical reactions, and capable of retaining their high activity over long periods of use” (column 1, lines 47-54). More specifically, Finch teaches that “[t]he activity of the catalysts may, in many instances, be further materially increased or promoted by the addition of small amounts of a sodium compound” (cf. column 4, lines 44-47). Finch is completely silent about carbon dioxide, as such, let alone any deactivating and life-shortening effects associated with having carbon dioxide.

Applicant respectfully submits that if the skilled person would have a reason to consult Notermann in relation to Finch's disclosures, in the absence of any reference in Finch to (effects of) carbon dioxide, he would have motivation only to follow Notermann's general teaching that the presence of leachable sodium tends to improve the efficiency of the system. It is emphasized that this general teaching is consistent with the teaching by Finch that the activity of the catalysts may, in many instances, be further materially increased or promoted by the addition of small amounts of a sodium compound” (column 4, lines 44-47). Thus, the skilled person is discouraged from applying a carrier with a low content of leachable sodium, let alone a carrier with a low sodium solubilization rate, e.g. no greater than 5 ppmw/5 minutes. This clearly leads away from the present invention.

In the absence of any reference in Finch to (effects of) carbon dioxide, the skilled person would not find any motivation to apply Notermann's specific teaching which aims at diminishing deactivating and life-shortening effects of associated with

carbon dioxide by using a carrier with a low content of leachable sodium. Preparing such carriers would also require elaborate procedures such as set out in Notermann's column 13, line 41 - column 14, line 65. As an addition, even if the skilled person would find motivation to apply a carrier with a low content of leachable sodium, then still he would not necessarily arrive at using a carrier with a low sodium solubilization rate, e.g. no greater than 5 ppmw/5 minutes. As indicated hereinbefore, the sodium solubilization rate of a carrier is a property which is distinct from bulk properties of the carrier material, such as for example its content of impurities (sodium) in the bulk carrier material (cf. Application, page 2, lines 34-36).

In view of the above, it is respectfully submitted that the rejections, based on Finch and Notermann, are not based on a proper consideration of Notermann, and that a proper consideration of Notermann in its entirety leads to the conclusion that Notermann leads away from the present invention. Thus, the subject matter of the claims at issue is unobvious and patentable over Finch in view of Notermann. The nonobviousness of the present claims over Finch and Notermann can be stated independent of whether or not Notermann's carrier inherently meets the solubilization rate instantly claimed.

In view of Examiner's comments in the paragraphs on pages 11 and 12 of the Office Action, Applicant wishes to make the following observations.

Notermann, column 11, lines 18-47, teaches that "[i]n many commercially used epoxidation reactors . . . the effluent stream always contains some carbon dioxide. In a reactor in which the effluent stream is recycled to the reactor, therefore, the feedstream always contains some carbon dioxide." Notermann goes on to explain that "[c]ommonly, the carbon dioxide is removed by a scrubbing device . . . placed in the effluent stream between the effluent outlet and the reactor outlet." Therefore, the distinction made by Notermann is between, on the one hand, processes in which the feedstream contains carbon dioxide and, on the other hand, processes in which the feedstream does not contain (significant quantities of) carbon dioxide (in the latter case, either there is no recycle of effluent, or carbon dioxide has been removed from the effluent stream prior to recycling to the feedstream). Notermann can make and did make this distinction, despite the fact that at least some carbon dioxide is produced in any epoxidation process (cf. also Notermann, column 1, lines 30-41). It is then clear from Notermann's passage in column 11 that the wording "in the presence of CO₂" (cf.

column 11, line 21) should be read as meaning that the feedstream contains carbon dioxide (compare the sentence of column 11, lines 21-24, with the sentence of column 11, lines 35-40), rather than that the wording "in the presence of CO₂" refers to carbon dioxide which is inevitably formed in the process.

Nevertheless, the Examiner has taken the position that -because "the catalysts will always be used in the presence of carbon dioxide"- "it would have been obvious to one having ordinary skill to combine the teachings of the references [i.e. Notermann and Finch] to overcome the problems of the prior art . . . to arrive at the claimed invention". It is respectfully submitted that one having ordinary skill would not combine the teachings of Notermann and Finch because, as set out in the subsequent paragraphs, the teachings are conflicting where they relate to the presence of sodium in the catalysts.

On the one hand, Finch teaches catalyst compositions having high initial activity and retaining their activity over long periods of use (column 1, lines 47-54), and also teaches that sodium compounds may be used in the preparation of the silver solution to be used in the preparation of the catalyst (column 2, line 41 – column 3, line 14), sodium compounds may be used as promoters (column 4, lines 57), and even the catalyst support may be pretreated with sodium hydroxide (column 5, lines 23-25). Finch's teachings have been illustrated in working examples relating to the catalysts and a process for making ethylene oxide from ethylene; cf. also the commentary to Finch's working examples in column 6, lines 28-35.

On the other hand, Notermann teaches that the carrier has a low content of leachable sodium (column 11, line 50 – column 12, line 6). However, Notermann's teaching is clearly limited to carriers for catalysts which are intended to be used in processes having carbon dioxide in the feedstream.

According to the MPEP, section 2143.01, "where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another." (citing *In re Young*, 927 F.2d 588, 18 U.S.P.Q.2d 1089 (Fed. Cir. 1991)). It is respectfully submitted that the Examiner has not weighed the power of each reference, and for this further reason the rejections are not properly based.

These observations support the earlier conclusion that the subject matter of the claims at issue is unobvious and patentable over Finch in view of Notermann.

3.2 Claims 13-19, 22-27

In view of claims 13-19 and 22-27, Applicant relies on the arguments presented above, in Section 3.1, in view of claims 1-6 and 9-12. These arguments apply analogously in support of nonobviousness of claims 13-19 and 21-27. The arguments presented in Section 3.1 are incorporated by reference in this Section 3.2.

3.3 Claims 28-34

In view of claims 28-34, Applicant relies on the arguments presented above, in Section 3.1, in view of claims 1-6 and 9-12. These arguments apply analogously in support of nonobviousness of claims 28-34. The arguments presented in Section 3.1 are incorporated by reference in this Section 3.3.

3.4 Claims 37-43, 46-49

In view of claims 37-43 and 46-49, Applicant relies on the arguments presented above, in Section 3.1, in view of claims 1-6 and 9-12. These arguments apply analogously in support of nonobviousness of claims 37-43 and 46-49. The arguments presented in Section 3.1 are incorporated by reference in this Section 3.4.

4. Rejection under 35 U.S.C. 103(a) over U.S. Patent No. 2,424,083 in view of U.S. Patent No. 4,994,587 and in further view of U.S. Patent No. 5,739,075

4.1 Claims 7-8

In view of claims 7 and 8, the following arguments are presented.

As shown above, the Examiner has not met the burden of proof necessary to support a theory of inherent disclosure by Notermann. Moreover, as discussed hereinbefore, it follows from the MPEP that "[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established." Also, as shown above, Notermann and Finch cannot be properly combined in the manner proposed by the Examiner in the rejection of claims 1-6 and 9-12 over these references. Thus, reliance upon Finch in view of Notermann, as applied above by the Examiner to claims 1-6 and 9-12, cannot properly support the rejections under 35 U.S.C. § 103 of claims 7 and 8.

As discussed previously, Finch, Notermann, and Matusz are all silent with respect to sodium solubilization rates. Because each of the presently rejected claims

involves “a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes”, any combination of these cited references could not teach or suggest the subject matter of claims 7 and 8. Therefore, these claims are unobvious and patentable over the cited art.

4.2 Claims 20-21

As shown above, the Examiner has not met the burden of proof necessary to support a theory of inherent disclosure by Notermann. Moreover, as discussed hereinbefore, it follows from the MPEP that “[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established.” Also, as shown above, Notermann and Finch cannot be properly combined in the manner proposed by the Examiner in the rejection of claims 13-19 and 22-27 over these references. Thus, reliance upon Finch in view of Notermann, as applied above by the Examiner to claims 13-19 and 22-27, cannot properly support the rejections under 35 U.S.C. § 103 of claims 20 and 21.

As discussed previously, Finch, Notermann, and Matusz are all silent with respect to sodium solubilization rates. Because each of the presently rejected claims involves “a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes”, any combination of these cited references could not teach or suggest the subject matter of claims 20 and 21. Therefore, these claims are unobvious and patentable over the cited art.

4.3 Claims 35-36

As shown above, the Examiner has not met the burden of proof necessary to support a theory of inherent disclosure by Notermann. Moreover, as discussed hereinbefore, it follows from the MPEP that “[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established.” Also, as shown above, Notermann and Finch cannot be properly combined in the manner proposed by the Examiner in the rejection of claims 28-34 over these references. Thus, reliance upon Finch in view of Notermann, as applied above by the Examiner to claims 28-34, cannot properly support the rejections under 35 U.S.C. § 103 of claims 35 and 36.

As discussed previously, Finch, Notermann, and Matusz are all silent with respect to sodium solubilization rates. Because each of the presently rejected claims involves “a carrier having a sodium solubilization rate no greater than 5 ppmw/5

minutes”, any combination of these cited references could not teach or suggest the subject matter of claims 35 and 36. Therefore, these claims are unobvious and patentable over the cited art.

4.4 Claims 44-45

As shown above, the Examiner has not met the burden of proof necessary to support a theory of inherent disclosure by Notermann. Moreover, as discussed hereinbefore, it follows from the MPEP that “[o]bviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a feature is later established.” Also, as shown above, Notermann and Finch cannot be properly combined in the manner proposed by the Examiner in the rejection of claims 37-43, and 46-49 over these references. Thus, reliance upon Finch in view of Notermann, as applied above by the Examiner to claims 37-43, and 46-49, cannot properly support the rejections under 35 U.S.C. § 103 of claims 44 and 45.

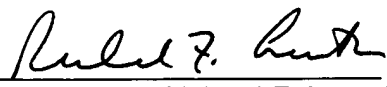
As discussed previously, Finch, Notermann, and Matusz are all silent with respect to sodium solubilization rates. Because each of the presently rejected claims involves “a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes”, any combination of these cited references could not teach or suggest the subject matter of claims 44 and 45. Therefore, these claims are unobvious and patentable over the cited art.

In conclusion, for the reasons set forth above, the Applicants request that the Board overturn the Examiner’s rejection.

Respectfully submitted,

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CLAIMS APPENDIX

1. A process for preparing a catalyst, said process comprising:
selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes;
depositing one or more catalytically reactive metals comprising silver on said carrier; and
depositing one or more promoters selected from phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof prior to, coincidentally with, or subsequent to the deposition of said one or more catalytically reactive metals.
2. A process according to claim 1 wherein the one or more promoters comprise lithium.
3. A process according to claim 2 wherein the one or more promoters comprise in addition a Group IA metal which is selected from potassium, rubidium, cesium, sodium, and combinations thereof.
4. A process according to claim 1 wherein the one or more promoters are selected from phosphorus, boron, fluorine, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.
5. A process according to claim 4 wherein said Group IIA metal is selected from magnesium, calcium, strontium, barium, and combinations thereof.
6. A process according to claim 4 wherein said Group VIII metal is selected from cobalt, iron, nickel, ruthenium, rhodium, palladium, and combinations thereof.
7. A process according to claim 4 wherein said rare earth metal is selected from lanthanum, cerium, neodymium, samarium, gadolinium, dysprosium, erbium, ytterbium, and combinations thereof.
8. A process according to claim 4 wherein the one or more promoters comprise rhenium.
9. A process according to claim 1 wherein said sodium solubilization rate has been achieved by a means effective in rendering ionizable species on the carrier surface ionic and removing that species, or rendering the ionizable species insoluble, or rendering the ionizable species immobile.

10. A process according to claim 9 wherein said means is selected from washing, ion exchange, volatilizing, impurity control, precipitation, sequestration, and combinations thereof.
11. A process according to claim 1 wherein said metal is deposited on said carrier by submersing said carrier in an impregnation solution wherein a hydrogen ion activity of said solution is lowered.
12. A process according to claim 11 wherein said hydrogen ion activity is lowered by addition of a base to said impregnation solution.
13. A process for preparing a catalyst suitable for the vapor phase production of epoxides, said process comprising:
- selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes;
 - depositing one or more catalytically reactive metals comprising silver on said carrier; and
 - depositing one or more promoters selected from phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof prior to, coincidentally with, or subsequent to the deposition of said one or more catalytically reactive metals.
14. A process according to claim 13 wherein the one or more promoters comprise lithium.
15. A process according to claim 14 wherein the one or more promoters comprise in addition a Group IA metal which is selected from potassium, rubidium, cesium, sodium, and combinations thereof.
16. A process according to claim 14 wherein the one or more promoters comprise in addition a Group IA metal which is cesium.
17. A process according to claim 13 wherein the one or more promoters are selected from phosphorus, boron, fluorine, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.
18. A process according to claim 17 wherein said Group IIA metal is selected from magnesium, calcium, strontium, barium, and combinations thereof.
19. A process according to claim 17 wherein said Group VIII metal is selected from cobalt, iron, nickel, ruthenium, rhodium, palladium, and combinations thereof.

20. A process according to claim 17 wherein said rare earth metal is selected from lanthanum, cerium, neodymium, samarium, gadolinium, dysprosium, erbium, ytterbium, and combinations thereof.
21. A process according to claim 17 wherein the one or more promoters comprise rhenium.
22. A process according to claim 13 wherein said sodium solubilization rate has been achieved by a means effective in rendering the ionizable species ionic and removing that species, or rendering the ionizable species insoluble, or rendering the ionizable species immobile.
23. A process according to claim 22 wherein said means is selected from washing, ion exchange, volatilizing, impurity control, precipitation, sequestration, and combinations thereof.
24. A process according to claim 13 wherein said carrier is an alumina-based carrier.
25. A process according to claim 24 wherein said alumina-based carrier is α -alumina.
26. A process according to claim 13 wherein the amount of a Group IA metal, if present, is in the range of from about 10 ppm to about 1500 ppm, by weight of the total catalyst, expressed as the metal; the amount of a Group VIIB metal, if present, is less than about 3600 ppm, by weight of the total catalyst, expressed as the metal; and the amount of silver is in the range of from about 1 percent by weight to about 40 percent by weight of the total catalyst.
27. A process according to claim 13 wherein said carrier has a surface area in the range of from about 0.05 m²/g to about 10 m²/g.
28. A catalyst comprising a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes; and deposited on said carrier a catalytically effective amount of one or more catalytically reactive metals comprising silver, and one or more promoters selected from phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.
29. A catalyst according to claim 28 wherein the one or more promoters comprise lithium.

30. A catalyst according to claim 29 wherein the one or more promoters comprise in addition a Group IA metal which is selected from potassium, rubidium, cesium, sodium, and combinations thereof.
31. A catalyst according to claim 29 wherein the one or more promoters comprise in addition a Group IA metal which is cesium.
32. A catalyst according to claim 28 wherein the one or more promoters are selected from phosphorus, boron, fluorine, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.
33. A catalyst according to claim 32 wherein said Group IIA metal is selected from magnesium, calcium, strontium, barium, and combinations thereof.
34. A catalyst according to claim 32 wherein said Group VIII metal is selected from cobalt, iron, nickel, ruthenium, rhodium, palladium, and combinations thereof.
35. A catalyst according to claim 32 wherein said rare earth metal is selected from lanthanum, cerium, neodymium, samarium, gadolinium, dysprosium, erbium, ytterbium, and combinations thereof.
36. A catalyst according to claim 32 wherein the one or more promoters comprise rhenium.
37. A catalyst suitable for the vapor phase production of epoxides comprising a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes; and deposited on said carrier a catalytically effective amount of one or more catalytically reactive metals comprising silver, and one or more promoters selected from phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.
38. A catalyst according to claim 37 wherein the one or more promoters comprise lithium.
39. A catalyst according to claim 38 wherein the one or more promoters comprise in addition a Group IA metal which is selected from potassium, rubidium, cesium, sodium, and combinations thereof.
40. A catalyst according to claim 38 wherein the one or more promoters comprise in addition a Group IA metal which is cesium.
41. A catalyst according to claim 37 wherein the one or more promoters are selected from phosphorus, boron, fluorine, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.

42. A catalyst according to claim 41 wherein said Group IIA metal is selected from magnesium, calcium, strontium, barium, and combinations thereof.
43. A catalyst according to claim 41 wherein said Group VIII metal is selected from cobalt, iron, nickel, ruthenium, rhodium, palladium, and combinations thereof.
44. A catalyst according to claim 41 wherein said rare earth metal is selected from lanthanum, cerium, neodymium, samarium, gadolinium, dysprosium, erbium, ytterbium, and combinations thereof.
45. A catalyst according to claim 41 wherein the one or more promoters comprise rhenium.
46. A catalyst according to claim 37 wherein said carrier is an alumina-based carrier.
47. A catalyst according to claim 46 wherein said alumina-based carrier is α -alumina.
48. A catalyst according to claim 37 wherein the amount of a Group IA metal, if present, is in the range of from about 10 ppm to about 1500 ppm, by weight of the total catalyst, expressed as the metal; the amount of a Group VIIB metal, if present, is less than about 3600 ppm, by weight of the total catalyst, expressed as the metal; and the amount of silver is in the range of from about 1 percent by weight to about 40 percent by weight of the total catalyst.
49. A catalyst according to claim 37 wherein said carrier has a surface area in the range of from about 0.05 m²/g to about 10 m²/g.